TITLE OF INVENTION: Method of Faceting of Gemstones to Produce Spiraling Effect

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METHOD OF FACETING OF GEMSTONES TO PRODUCE SPIRALING EFFECT

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to methods for cutting gemstones of enhanced brilliancy and scintillation and to gemstones produced by such methods.

Description of the Prior Art

The beauty of a gemstone is determined by its inherent physical and optical properties in combination with any alterations made to the gemstone in order to improve the display of these properties. Accordingly, the aesthetic appeal of a gemstone is often enhanced through polishing and/or cutting. While the aesthetic benefits of polishing are self-evident, the advantages of gem cutting may not be readily apparent to most outside the gemology field. Essentially, the gem cutter's craft involves cutting a stone at different angles relative to a predetermined plane to produce a series of flat surfaces or "facets" on the gemstone.

Most jewelry consumers are familiar with the basic so-called "brilliant-cut diamond" as it is one of the more common cut gemstones available today. As shown in a simplified side view in Fig. 1, there are three general sections or portions that form a brilliant-cut gemstone of the prior art: the crown (top portion), the girdle (middle portion), and the pavilion (bottom portion). The girdle is the narrow rim of the gemstone that separates the crown from the pavilion. Moreover, the girdle is the section

with the largest diameter of any part of the stone. On the very bottom of the gemstone there often is a pointed tip having a tiny facet called the culet. Conversely, the large, flat facet on top of the crown is known as the table.

The optical appeal of a gemstone (especially for diamonds) is largely measured in terms of "brilliance" (i.e., shine) and "scintillation" (the flashing or sparkling that occurs when the gemstone or observer moves). Brilliance can be explained in terms of a combination of externally and internally reflected light. Referring again to Fig. 1, when of rays of light hit the crown of a gemstone, some are reflected while others enter the gemstone through the table. However, most of the rays that enter the gemstone are reflected totally at the pavillion (i.e., the rays of light do not leave the pavilion but are reflected inward again). These rays subsequently exit the gemstone upon reaching the crown again and, in combination with the externally reflected light, are perceived by an observer as enhanced "shine." How much total reflection takes place largely depends on the angle of the pavillion facets. Furthermore, how a gemstone is cut affects how light is perceived in other desirable ways as well. For example, scintillation depends primarily on the size of the gemstone, the number of facets, and the angles of those facets. Generally speaking, the more facets of different angles present on a gemstone, the more scintillation can be expected.

In the past century, gem cutters have found ways to increase the brilliance and scintillation of gemstones (particularly diamonds) by experimenting with various designs that involve different facet numbers, different facet placement, and different facet angles. For example, the traditional brilliant-cut diamond typically includes 58 facets, 24 of which are disposed upon the pavillion. In an attempt

to further increase brilliance and/or scintillation, inventors, such as Huisman et al. in U.S. Patent No. 3,286,486, have created variations on the basic brilliant cut. Essentially, Huisman et al. created a gemstone with enhanced brilliancy by making a pavilion with seventy-two facets. The greatly increased number of facets in the pavilion and the different angles at which many of them are cut result in enhanced light reflection as discussed above. Other inventors have sought to improve gemstone scintillation by making the number of mid-level pavilion facets an odd number rather than the standard even number of facets (see Elbe, U.S. Pat. No. 3,788,097) or by cutting facets at different angles and in novel arrangements (see Kejejian, U.S. Patent No. 6,449,985) .

In addition to improving brilliance and scintillation, it has been thought that simple geometric effects (e.g., approximating the look of a chrysanthemum) would produce desirable results when cut into gemstones. Thus, in some of these cuts, the facets are arranged to approximate natural curves, such as the petals of a flower. A few examples of such cuts can be found on pages 5, 9, 16, 32, 50, 51, 75, 83, 100, 101, 125, 141 and 142 of "Diagrams For Faceting", Volume II, by Glenn & Martha Vargas. However, elaborate geometric effects can also detract from brilliance and scintillation as the static image (e.g., a flower) effects how light is reflected and can distract the viewer.

Although these attempts to improve the optical properties of a gemstone have met with varying degrees of success, there is always the need for new cuts that further enhance the brilliance and scintillation of a gemstone. Thus, there is currently a need for an arrangement of facets that can increase the brilliance and scintillation of a cut gemstone and that can further enhance those qualities by producing a dynamic spiraling effect on the gemstone's crown.

SUMMARY OF THE INVENTION

The invention relates in general to cut gemstones and methods for producing the same that feature a spiraling effect on the crown. More particularly, the invention includes a method for cutting a gemstone such that crown facets radiate in a spiral fashion from a small table or facet at the crown's center. Thus, the crown facets are cut starting at the center facet, with subsequent facets disposed between proceeding facets such that each subsequent facet shares an edge with each of two preceding facets.

Preferably, a gemstone cut according to the invention has crown facets that are formed to resemble parallelograms or squares. Also, in one preferred embodiment, the a gemstone cut according to the invention has 176 crown facets disposed in 11 sets of 16 facets, with one center facet that defines a horizontal plane. Moreover, the preferred angles at which each set of facets is cut are as follows: set one 15 degrees, set two 19 degrees, set three 25 degrees, set four 30 degrees, set five 34 degrees, set six 38 degrees, set seven 46 degrees, set eight 56 degrees, set nine 65 degrees, set ten 75 degrees; and set eleven 90 degrees.

The gemstones of the invention also feature a girdle and a pavillion, with the pavillion preferably including 16 symmetrically disposed facets extending form the girdle to a culet facet disposed at the bottom tip of the pavillion. The angles at which the pavillion facets are cut are preferably 40.75 degrees (relative to the horizontal plane defined by the center facet of the crown).

Because the pavillion does not vary from the so-called "critical angle" of 40.75 degrees, superior internal light reflection is produced and brilliance enhanced. Moreover, a cut gemstone of the invention has a unique profile look (side view) compared to prior art cuts with large tables. In other words, an observer is able to view enhanced brilliance, fire, and scintillation from many more directions due to the greater number of facets that are possible when the table is miniaturized to a mere center facet.

It is an object of the invention to provide a cut gemstone with a crown that enhances scintillation by producing a spiraling effect.

Another object of the invention is to provide a cut gemstone with enhanced brilliance.

An additional object of the invention is to provide a method that makes it possible to produce a cut gemstone having a spiraling effect upon its crown.

A further object of the invention is to provide a method that makes it possible to produce a cut gemstone that enhances several optical properties simultaneously.

In accordance with these objects, a new and improved cut gemstone and method of cutting a gemstone are provided.

Various other purposes and advantages of the invention will become clear from its description in the specification that follows. Therefore, to the accomplishment of the objectives described above, this invention includes the features hereinafter fully described in the detailed description of the preferred embodiments, and particularly pointed out in the claims. However, such description discloses only some of the various ways in which the invention may be practiced.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic, elevational view of a simplified brilliant-cut gemstone of the prior art.

Fig. 2A is a schematic, top plan-view of a preferred embodiment of the invention.

Fig. 2B is a schematic, top plan-view of an alternative center facet (and first set of facets) arrangement for the gemstone shown in Fig. 2A.

Fig. 3 is a schematic, elevational view of the gemstone shown in fig. 2A.

Fig. 4 is a schematic, bottom plan-view of the gemstone shown in Fig. 2A.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The invention generally involves faceted gemstones, and methods for cutting such gemstones, that provide a stunning "spiraling effect" on the gemstone's crown. More particularly, the invention includes a method of cutting a gemstone such that each facet in a "set" of facets (starting with the second set) is disposed or "nested" between two preceding facets. By cutting such an arrangement or pattern of facets, the crown of the gemstone actually appears to radiate in a spiral fashion from the small table or center facet at the crown's top and center. Preferably, facets are cut starting at the center facet (which defines a horizontal plane against which the angles of all other facets are determined).

Basically, the more light that can be received and reflected by a gemstone, the greater the brilliance and scintillation. Thus, a gemstone of the invention has a much larger crown area (due to the substitution of a very small center facet for the relatively large table that is found on many other cut gems), more crown facets than are found on a traditional brilliant-cut gem, more variety of crown facet angles, and a unique spiraling effect that makes the invention different from any other cut gemstones of which the inventors are aware. Moreover, due to the spiraling effect of the crown facet arrangement, the stone (and particularly the crown area) actually appears to be in motion, thereby further enhancing scintillation in particular.

Referring to Fig.1, a gem of the prior art is portrayed to outline the basic portions of a simplified brilliant-cut gemstone. As shown, the gemstone has a crown (or upper portion), a pavilion (or lower

portion) and a girdle (or intermediate portion) between the crown and the pavilion. The crown and the pavilion face in opposite directions. The gemstone also has a central longitudinal axis A which constitutes an axis of symmetry around which the facets on the pavillion (or elsewhere) can be disposed.

The following description will describe various facet angles. The angles, which are simply numbers, are derived from indexes included with the equipment used in gem cutting. Thus, in order to cut or facet a gemstone that is to be converted into a gem of the invention, the gemstone is placed in a dop or holder. The dop is rotated on a vertical axis, which coincides with the symmetry axis A of the gem shown in Fig. 1, by an indexing gear. In the present case, it is assumed that the indexing gear has 90 teeth which are assigned the indexes or numbers 1 to 90, respectively. When this gear indexes from one tooth to the next, the gear and the gemstone rotate through an angle of 1.0 degree. Thus, tooth 2 or index 2 represents an angle of rotation of 2.0degrees; tooth 45 or index 45 an angle of rotation of 45 degrees, and so on.

The gemstone is cut at various angles which are measured from a plane normal to the axis of rotation of the gemstone. Since the gemstone is rotated about a vertical axis, the plane is horizontal. Moreover, it is common practice to define the table or center facet on the very top of the crown as a horizontal plane (i.e., a zero degree angle), thereby providing a reference angle against which subsequent cuts are measured.

Turning to Fig. 2A, a top plan view of a preferred gemstone of the invention is shown. The gemstone crown 2 is provided with a small table, which in this case is a star-shaped center facet 4, and with concentrically disposed "sets of facets" numbered from 6 to 24. Each set of facets 6 through 24 contain sixteen individual facets, with each subsequent set contiguous with, and forming a ring around, each previous set. Moreover, each set of facets 6-24 grows larger as the cuts are made radially outward from the center facet 4 to the outer periphery of crown 2. Thus, facet set 6, which is disposed adjacent to the center facet 4, is contiguous with and ringed by facet set 8, while facet set 8 is contiguous with and ringed by facet set 10, and so on until the periphery of the crown 2 is reached at facet set 24.

With the exception of the first facet set (in this case, facet set 6), the individual facets of each subsequent facet set 8 through 24 is "nested" or disposed between two preceding facets. In other words, each individual facet of sets 6 through 24 share one edge with two facets from a preceding set. Thus, for example, a facet in set 16 shares edges 14a and 14b with two facets of set 14. Because subsequent facets are disposed between preceding facets, a spiraling effect (as indicated by arrows 26) is created, and the crown 2 appears to be in motion.

Preferably, the individual facets found within a particular set of sets 6 through 24 are identical, are uniformly distributed circumferentially on the crown 2, and resemble squares (diamonds) or parallelograms in shape. Furthermore, neighboring facets are contiguous with one another up to the outer edge 24a of each facet in set 24, which coincides with the upper edge of the girdle 40 (not shown in this view, see Fig. 3). Each facet on the crown may be polished as desired.

Also preferably, the individual facets found within a particular set 6 through 24 are all cut at the same angle. Thus, for the preferred embodiment illustrated in Fig. 2A, all facets within set 6 are 19 degrees; within set 8, all facets are 25 degrees; the facets of set 10 are 30 degrees; the facets of set 12 are 34 degrees; the facets of set 14 are 38 degrees; the facets of set 16 are 46 degrees; the facets of set 18 are 56 degrees; the facets of set 20 are 65 degrees; the facets of set 22 are 75 degrees; and the facets of set 24 are 90 degrees.

As one skilled in the art would readily appreciate, the invention is not limited to one center facet design. Thus, Fig. 2B illustrates an alternative arrangement to the star-shaped center facet 4 of Fig. 2A. As shown, the alternative center facet arrangement 28 features a substantially circular center facet 30 that is surrounded by a first set of facets 31, which includes sixteen diamond-shaped facets 32. If arrangement 28 where to be substituted for star-shaped facet 4, the preferred angles for facets 32 would be 15 degrees. Also, the total number of facets on crown 2 (not including the center facet) would increase to 176 in number.

Turning to Fig. 3, an elevational view of the embodiment shown in Fig. 2A is illustrated. In this view, all portions of the gemstone 38 are visible. Thus, crown 2 extends from horizontal axis B to girdle 40. Below girdle 40, the pavilion 42 is preferably provided with sixteen facets 44, with each cut at a 40.75 degree angle. The facets 44 extend radially inward from girdle 40 to the culet 46 at the tip of the pavillion 42. The pavilion facets 44 preferably are identical and are uniformly distributed circumferentially around the pavillion 42. Neighboring ones of the pavilion facets 44 contact one

another (i.e., are contiguous) along common radial boundaries 44a. The pavilion facets 44 may be polished as desired.

As shown most clearly in Fig. 4, the sixteen facets 44 of pavillion 42 are symmetrically disposed with respect to the culet 46. Therefore, enhanced internal reflection of light is attained.

Various changes in the details and components that have been described may be made by those skilled in the art within the principles and scope of the invention herein described in the specification and defined in the appended claims.

For example, it may be desirable to add to or subtract from the number of facets on the crown so that the spiraling effect and other optical properties can be optimized in accordance with individual stone characteristics, such as size, clarity, or color.

Therefore, while the present invention has been shown and described herein in what is believed to be the most practical and preferred embodiments, it is recognized that departures can be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent processes and products.